

## Family CORALLIOPHILIDAE

Coralliophila violacea (Kiener, 1835)

Living specimens common on living coral (Porites) and in coral debris on outer part of reef flat and offshore at least to depth of 18 meters (60 feet).

Magilus robillardi Lienard, 1870

Abraded shells from beach deposits.

Quoyula madreporarum (Sowerby, 1834)

Living specimens imbedded in coral (Pocillopora) on reef flat and off edge of reef flat to depth of at least 18 meters (60 feet).

A Pycnogonid Infestation of Mytilus californianus

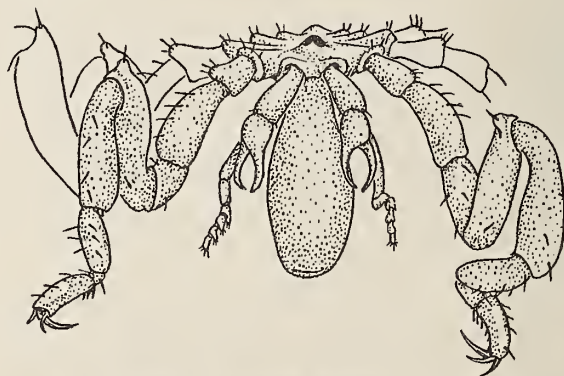
by

PETER H. BENSON & DUSTIN D. CHIVERS

San Francisco State College, San Francisco, California  
California Academy of Sciences, San Francisco, California  
(Plate 3)

Thirty-two specimens of Mytilus californianus Conrad were collected by the authors at Duxbury Reef (37°53'30" N., 122°42' W), Marin County, California, on February 20, 1960. Upon examination, 16 of the 32 mussels exhibited infestation by the pycnogonid Achelia chelata (Hilton, 1939) (= Ammonothea euchelata Hedgpeth, 1940). A total of 89 pycnogonids were counted, the incidence ranged from one to 21 parasites per host. The latter specimen is illustrated in plate 3, fig. 1. Immature and apparently mature parasites of both sexes were represented. Obvious destruction to the host's ctenidial and gonadal tissue was evident (see plate 3, fig. 2). Damage to the visceral mass, foot and palps was also apparent in several mussels. In the specimen exhibiting the greatest amount of damage, there was a complete loss of ctenidia and the major portion of mantle and gonadal tissue, accompanied by apparent atrophy of the entire animal. It is of interest to note that a group from Chico State College under the direction of Dr. Rodgers examined over 50 specimens of Mytilus californianus from Tomales Point, Marin County, on May 1, 1960, and found no pycnogonids. They did, however, encounter a high incidence of the pea crab Fabia subquadrata Dana within the bivalves. This commensal was not encountered in the mussels examined by us. Another commensal pea crab, Pinnotheres latissimus Bürger, was encountered by Ohshima (1935) in Japan

during his examinations of Paphia. In this latter case the presence of these crabs seemed in no way to interfere with the parasitism by pycnogonids mentioned later in this report.



Textfigure 1: Achelia chelata (HILTON)  
Frontview of Holotype of Ammonothea euchelata HEDGPETH. Reproduced with permission from J. W. Hedgpeth. Jour. Wash. Acad. Sci., 1940, figure 1, page 85.

Achelia chelata was reported by Hilton (1939) as occurring on the central California Coast. Hedgpeth (1940) collected a male of this species (text fig. 1) from Bugula at Pescadero, San Mateo County, California. An occurrence has also been recorded from Moss Beach, San Mateo County, California (S. F. Light, et al., 1957). Ziegler (1960) collected a specimen of A. chelata on the rock substrate under a Mytilus bed at Duxbury Reef, Marin County, California.



Figure 1



Figure 2

See Text for Explanation



Linné (1767) was the first to cite a pycnogonid-lamellibranch relationship. He accepted J. G. König's observation on an Icelandic specimen, Phalangium grossipes Linné, and stated: "... Mytilorum testasque penetrat et exhaurit." Fabricius (1780) and Dohrn (1881) refuted the possibility of such an occurrence. Upon examination of the Linnean specimen, Calman (1929) referred it to the common species Phoxichilidium femoratum Rathke and was of the opinion that, in all probability, König was mistaken.

Various other authors have reported incidental associations of lamellibranchs and pycnogonids. Specimens of Pycnogonum littorale Stroem have been reported by Hoek (1881) as living on the shells of Ostrea from the banks of the Scheldt near Wemeldinge, South West Netherlands. Ammonothea longipes Hodge was found on mussels attached to the hull of a coalboat at Arcachon, France, by Cuenot (1921). Hilton (1915) collected Halosoma viridintestinalis Cole from amidst the mussels at Laguna Beach, California. While collecting at Shark Island, Port Jackson, Australia, Flynn (1918a, 1919b) obtained a single male specimen of Halosoma haswelli Flynn from between the mussels (Brachyodontes hirsutus Lk.) and a female specimen of Ammonothea australiensis Flynn among mussels and sponges.

A parasitic association between a lamellibranch and a pycnogonid was reported by Ohshima in 1927. Specimens of Tapes (= Paphia) philippinarum Adams and Reeve from Fukuoka, Japan, were found to be hosts for a new genus and species of pycnogonid, Nymphonella tapetis Ohshima (1927a). The immature parasites were found attached to the ctenidia, visceral mass, and mantle of the host. Later, Ohshima (1927b) recorded the same pycnogonid as occurring in Protothaca jodoensis Lischke from the same locality. The first adult specimens of Nymphonella tapetis, two females, were collected from the sandy bottom at low tide near Fukuoka in 1932 (see Ohshima, 1933). Two adult males of the species were obtained, one from the sandy bottom of the mouth of Tomioka Bay, Amakusa, and the other from the bottom off Kadzusa, Shimabara Peninsula, Japan. These adult forms were assumed by Ohshima (1935) to be free living. Definite fluctuations between a high incidence (March to June) and a low incidence of host infestation (August to September) led

Ohshima (1937) to state that in all probability the fully developed young leave the mantle cavity of the host between the end of May and middle of June to begin their free life as adults in the sandy substrate. Le Calvez (1950) reports Nymphonella tapetis from the Mediterranean as a free-living form. Another species N. lambertensis was described by Stock (1959). The pycnogonid was dredged from the sandy bottom in 15 meters of water at Lambert's Bay, north of Cape Town, South Africa. Stock also considers Calvez' Mediterranean form in some respects as intermediate between Ohshima's Japanese and his South African species.

Pycnogonids have also been found parasitic upon gastropods. Merton (1906) found a new species, Nymphon parasiticum, parasitic upon the opisthobranch Tethys leporina Linné from Naples. Ohshima (1933) relates another case of parasitism on an opisthobranch. A specimen of Armina variolosa Bergh, collected at Hojo, Province of Awa, was found to be infested by 40 young pycnogonids of the genus Ammonothea. An interesting case of parasitism, reported by Stock (1959) of the pycnogonid Hannonia upon the polychate Audovina australis from Langebaan Lagoon, South Africa, is the first instance in which such a relationship has occurred except for vague indications of similar incidences in Helfer and Schlottke (1935).

As far as the authors can ascertain, this is the first time the parasitism of Mytilus californianus by Achelia chelata has been reported. This occurrence is also the third such pycnogonid-lamellibranch relationship to be recorded.

#### ACKNOWLEDGMENTS

We would like to express our sincere appreciation to Dr. Joel W. Hedgpeth for his generous aid in supplying literature and suggestions. We also wish to extend our gratitude to Mr. Charles E. Crompton of the California Academy of Sciences and to the Academy itself for their willing help in making possible the photographic material supplementing this paper.

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